REMARKS

This amendment is responsive to the Office Action of August 3, 2009. Reconsideration and allowance of claims 1-17 are requested.

The Office Action

Claims 1-7 and 10-13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Ho et al. (US 6,963,768) or Balloni et al. (US 6,725,077).

Claims 8 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ho et al. or Balloni et al. in view of Van der Meulen et al. (US 5,758,646).

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ho et al. or Balloni et al. in view of Smith

The Present Application

The present application is directed to exploiting a whole body plan scan to gather individual patient information to determine optimized acquisition parameters of a high resolution image of a region of interest of a subject.

The References of Record

Ho et al. discloses interactive control for the operator to change scan parameters and table motion and direction at a plurality of patient positions. Smaller FOV's with varying transmitter, receiver, and/or gradient parameters are composited into a larger FOV.

Balloni et al. discloses iteratively acquiring and displaying localizer images with varying prescriptions until suitable localizer image is acquired. Then a target image is acquired based on the prescription of the suitable localizer image. See page 2, lines 5-24 of the present application.

Van Der Meulen et al. discloses optimizing an elementary imaging sequence based on selected operational parameters, i.e. field of view, slice thickness, echo or repetition time, location, orientation, and SAR, prior to acquiring magnetic resonance data.

Smith discloses a technique for measuring the similarity of a known tumor at a primary location to an unknown tumor at a remote location. A degree of similarity is determined between a training set and a test set of images.

The Claims Distinguish Patentably Over the References of Record

Applicant notes the Office Action does not reject each and every element of claims 1-7 and 10-13. Indeed, although the Summary of the Office Action indicates that claims 1-7 and 10-13 stand rejected, the Detailed Action omits any explanation of how any cited art renders anticipated and/or obvious each and every element theses claims. Applicant respectfully submits that this omission amounts to a failure to articulate a prima facie case of unpatentablity and the burden to rebut this "rejection" has not yet shifted to the Applicant. Consequently, a next Office Action rejecting claims 2-10, 13, and 15-17 cannot properly be made final since only then would the Applicant be obligated to rebut the rejection, presuming that such an Office action sets forth a prima facie case. (See MPEP § 706.07(a)).

Claims 1-7 and 10-13 Distinguish Patentably Over Ho et al.

Claim 1, as amended, calls for a magnetic resonance imaging (MRI) system for acquiring a high resolution image of a region of interest. A scanning unit, which is controllable by a control unit, acquires a low resolution whole-body plan scan image and high resolution images of selectable regions of the body. A body identification module autonomously identifies and locates the region of interest in the whole-body plan scan image. An acquisition parameter module determines acquisition parameters based on the identified and located region of interest. And the control unit controls the scanning unit to acquire a high resolution image of the region of interest using the determined acquisition parameters.

Ho et al. teaches away from a low resolution whole-body plan scan image in that a continuous moving table imaging technique with interactive control (column 2, lines 36-40) allows for high resolution imaging (column 2, lines 16-52) such that specific anatomical regions will only be imaged while moving through a region of optimal magnetic field homogeneity and gradient field linearity (column 2, lines 31-34). There is no apparent disclosure of a low resolution image acquired prior

to or as the basis of the continuous moving table image sequence. Though the table position is continuous, the operator must define the number of multi-planar sections which are of same resolution. A section can be bookmarked for further study, i.e. a higher resolution scan; however, the higher resolution scan parameters are not based on the previous scan and no suggestion is available to make such a conclusion. Furthermore, Ho et al. does not disclose, as cited by the Examiner or otherwise, autonomous identification and location of a region of interest.

Claim 10, as amended, calls for a computer readable medium which stores a computer program for a controlling a magnetic resonance imaging system. The program performs the steps of acquiring a low resolution whole-body plan scan image. Autonomously identifying and locating one or more regions of interest in the whole-body plan scan image. Determining acquisition parameters based on the identified and located region of interest. And acquiring a high resolution image of the region of interest using the determined acquisition parameters.

Ho et al. teaches away from a low resolution whole-body plan scan image in that a continuous moving table imaging technique with interactive control (column 2, lines 36-40) allows for high resolution imaging (column 2, lines 16-52) such that specific anatomical regions will only be imaged while moving through a region of optimal magnetic field homogeneity and gradient field linearity (column 2, lines 31-34). There is no apparent disclosure of a low resolution image acquired prior to or as the basis of the continuous moving table image sequence. Though the table position is continuous, the operator must define the number of multi-planar sections which are of same resolution. A section can be bookmarked for further study, i.e. a higher resolution scan; however, the higher resolution scan parameters are not based on the previous scan and no available suggestion to conclude otherwise. Furthermore, Ho et al. does not disclose, as cited by the Examiner or otherwise, autonomous identification and location of a region of interest.

For the reasons set forth above, it is submitted that Ho et al. fails to teach all of the features of the Applicants' invention; therefore, does not anticipate **claims 1 and 10**. Applicants submit that the subject application is patently distinguished from the cited prior art and respectfully request the rejection of claims 1 and 10 be

withdrawn. Accordingly, it is submitted that **claims 2-9 and 11-17 dependent therefrom** distinguish patentably and over the references of record.

Claims 1-7 and 10-13 Distinguish Patentably Over Balloni et al.

Claim 1, as amended, calls for a magnetic resonance imaging (MRI) system for acquiring a high resolution image of a region of interest. A scanning unit, which is controllable by a control unit, acquires a low resolution whole-body plan scan image and high resolution images of selectable regions of the body. A body identification module autonomously identifies and locates the region of interest in the whole-body plan scan image. An acquisition parameter module determines acquisition parameters based on the identified and located region of interest. And the control unit controls the scanning unit to acquire a high resolution image of the region of interest using the determined acquisition parameters.

Balloni et al. teaches of iteratively acquiring localizer images with varying prescriptions until a suitable one is acquired, and acquiring a target image according to the prescription of the suitable localizer image. Balloni et al. does not disclose, as cited by the Examiner or otherwise, of a body identification module which autonomously identifies and locates the region of interest in the whole body plan scan image. Furthermore, Balloni et al. teaches away from an acquisition parameter module determining acquisition parameters on the basis of the identified and located region of interest such that, as admitted by the Examiner on page 3 of the Office Action, the operator must specify the imaging parameters based on the suitable localizer image (column 7, lines 46-48).

Claim 10, as amended, calls for a computer readable medium which stores a computer program for a controlling a magnetic resonance imaging system. The program performs the steps of acquiring a low resolution whole-body plan scan image. Autonomously identifying and locating one or more regions of interest in the whole-body plan scan image. Determining acquisition parameters based on the identified and located region of interest. And acquiring a high resolution image of the region of interest using the determined acquisition parameters.

Balloni et al. teaches of iteratively acquiring localizer images with varying prescriptions until a suitable one is acquired, and acquiring a target image

according to the prescription of the suitable localizer image. Balloni et al. does not disclose, as cited by the Examiner or otherwise, of a autonomously identifying and locating the region of interest in the whole-body plan scan image. Furthermore, Balloni et al. teaches away from determining acquisition parameters on the basis of the whole-body plan scan image such that, as admitted by the Examiner, the operator must specify the imaging parameters based on the suitable localizer image (column 7, lines 46-48).

For the reasons set forth above, it is submitted that Balloni et al. fails to teach all of the features of the Applicants' invention; therefore, does not anticipate **claims 1 and 10**. Applicants submit that the subject application is patently distinguished from the cited prior art and respectfully request the rejection of claims 1 and 10 be withdrawn. Accordingly, it is submitted that **claims 2-9 and 11-17 dependent therefrom** distinguish patentably and over the references of record.

Claims 8 and 14 Are Not Obvious In View of Van Der Meulen et al.

Claim 8, as amended, calls for the determined acquisition parameters to be optimized with respect to a specific absorption rate model and/or a peripheral nerve stimulation model. Van Der Meulen et al. discloses optimizing an elementary imaging sequence based on selected operational parameters, i.e. field of view, slice thickness, echo or repetition time, location, orientation, and SAR, prior to acquiring magnetic resonance data. Van Der Meulen et al. teaches away from the concept of Claim 8 such that the elementary imaging sequence is not based on a low resolution whole-body plan scan and the operational parameters are not determined based on a low resolution whole-body plan scan.

Claim 14 calls for extracting body position parameters and optimizing acquisition parameters with respect to a specific absorption rate model and/or a peripheral nerve stimulation model. Van Der Meulen et al. discloses optimizing an elementary imaging sequence based on selected operational parameters, i.e. field of view, slice thickness, echo or repetition time, location, orientation, and SAR, prior to acquiring magnetic resonance data. Van Der Meulen et al. teaches away from the concept of Claim 14 such that the elementary imaging sequence is not based on a low

resolution whole-body plan scan and the operational parameters are not determined based on a low resolution whole-body plan scan.

For the reasons set forth above, it is submitted that Ho et al. or Balloni et al. in combination with Van Der Meulen et al. fails to teach all of the features of the Applicants' invention; therefore, does not anticipate **claims 8 and 14**. Applicants submit that the subject application is patently distinguished from the cited prior art and respectfully request the rejection of claims 8 and 14 be withdrawn.

Claim 9 Is Not Obvious In View of Smith

Claim 9, as amended, calls for a pattern recognition module which autonomously indentifies parts of the body on the basis of the whole-body plan scan image. Smith discloses a technique for measuring the similarity of a known tumor a primary location to an unknown tumor at a remote location. A degree of similarity is determined between a training set and a test set of images. Though Smith does disclose of pattern recognition, it does not disclose, as cited by the Examiner, of a low resolution whole-body plan scan image, a body identification module, parameter acquisition module, or a high resolution image of the region of interest. Therefore, we have determined that the Examiner has not provided sufficient reason or explicit analysis of why the disclosures of the references should be combined. Furthermore, Smith teaches against acquiring a high resolution image such that:

> "Combining low resolution measurements made by different modalities usually results in more accurate identification than could be achieved by a high-resolution NMR spectrometer alone." (column 4, lines 55-58);
>
> "It is often possible to obtain greater discriminating variance by combining several low-resolution measurements made on different modalities than can be obtained with measurements made on a single high-resolution instrument" (column 4, lines 64-67); and
>
> "We have found that maximum classification accuracy is reached using relatively low spatial resolution for the ME-6 pulse sequence, which helps decrease the total imaging time. Using this sequence with a 64. times.256 pixel array (phase, frequency) leads to greater

> classification accuracy than an array having a higher spatial resolution (128×256), because decreasing the spatial resolution increases the pixel size, which improves the signal-to-noise ratio. This amounts to trading spatial resolution to gain greater spectral resolution, which represents greater information content per pixel. This departs from the traditional approach in MRI, which strives above all else to achieve high spatial resolution."

For the reasons set forth above, it is submitted that Ho et al. or Balloni et al. in combination with Smith fails to teach all of the features of the Applicants' invention; therefore, does not anticipate **claim 9**. Applicants submit that the subject application is patently distinguished from the cited prior art and respectfully request the rejection of claim 9 be withdrawn.

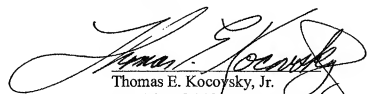
CONCLUSION

For the reasons set forth above, it is submitted that claims 1-17 (all claims) distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he is requested to telephone Thomas E. Kocovsky, Jr. at 216.363.9000.

Respectfully submitted,

Fay Sharpe LLP



Thomas E. Kocovsky, Jr.
Reg. No. 28,383
The Halle Building, 5th Floor
1228 Euclid Avenue
Cleveland, OH 44115-1843
216.363.9000